

What is claimed is:

1. A particle comprising calcium phosphate having an allergen at least partially coating the particle or impregnating the particle or both, wherein the particle has a diameter between
5 about 300 nm and about 4000 nm.
2. The particle of claim 1, wherein the particle has a substantially spherical shape and a substantially smooth surface.
- 10 3. The particle of claim 1, wherein the allergen is selected from the group consisting of house dust mite, animal dander, molds, pollens, ragweed, latex, vespid venoms and insect-derived allergens., and combinations thereof.
4. The particle of claim 1, further comprising a surface modifying agent at least partially
15 coating the particle or impregnating the particle or both.
5. The particle of claim 4, wherein the surface modifying agent comprises a basis or modified sugar.
- 20 6. The particle of claim 5, wherein the surface modifying agent comprises cellobiose.
7. The particle of claim 4, wherein the surface modifying agent comprises a carbohydrate, a carbohydrate derivative, or other macromolecule with carbohydrate-like components characterized by the abundance of –OH groups.
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8. The particle of claim 4, wherein the surface modifying agent comprises polyethylene glycol.

9. The particle of claim 4, further comprising at least a partial coating of an allergen, wherein the surface modifying agent is at least partially disposed between the surface of the particle and the allergen.

5 10. A method for inducing an immune response in a patient, comprising delivering a particle of claim 1 to a patient in need thereof.

11. The method of claim 10, wherein the particle is delivered subcutaneously, through inhalation, or across a mucosal surface.

10 12. The method of claim 10, wherein the particle is complexed with a pharmaceutically acceptable excipient and delivered as a spray, an aerosol, an ointment, an eye drop, a gel, a suspension, a capsule, a suppository, an impregnated tampon, or combinations thereof.

15 13. A method for preparing one or more particles of claim 1, comprising reacting a soluble calcium salt with a soluble phosphate salt and an allergen.

14. The method of claim 13, wherein the soluble calcium salt comprises calcium chloride and the soluble phosphate salt comprises sodium phosphate.

20 15. The method of claim 14, where the reacting comprises:

- (a) mixing an aqueous solution of calcium chloride with an aqueous solution of sodium citrate to form a mixture;
- (b) adding an aqueous solution a sodium phosphate to the mixture to form a
25 solution;
- (c) stirring the solution until particles of the desired size and comprising calcium phosphate are obtained; and
- (d) contacting the particles with an allergen to form particles that are at least partially coated with the allergen.

16. The method of claim 15, wherein the concentrations of each of the aqueous calcium chloride, the aqueous sodium citrate, and the aqueous sodium phosphate solutions are independently between about 5 mM and about 100 mM.

5 17. A method for preparing one or more particles of claim 4, wherein the surface modifying agent is at least partially coating the particle, comprising:

(a) adding a surface modifying agent to a suspension of calcium phosphate particles to form a mixture, and

(b) allowing the mixture to stand for sufficient time for the surface modifying

10 agent to cover at least a portion of the particles to form at least partially coated particles.

18. The method of claim 17, wherein the surface modifying agent and suspension of calcium phosphate particles are present in a ratio of about 1:20 by volume.

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19. The method of claim 18, further comprising contacting the at least partially coated particles with a solution containing an allergen to form particles that are at least partially coated with the allergen.

20 20. A method for preparing one or more particles comprising calcium phosphate and an allergen at least partially coating the particle and a surface modifying agent at least partially coating the particle, wherein the particle has a diameter between about 300 nm and about 4000 nm, and has a substantially spherical shape and a substantially smooth surface comprising:

25 (a) adding a surface modifying agent to a suspension of calcium phosphate particles to form a mixture, and

(b) allowing the mixture to stand for sufficient time for the surface modifying agent to cover at least a portion of the particles to form at least partially coated particles; and;

- (c) contacting the at least partially coated particles with a solution containing an allergen to form particles that are at least partially coated with the allergen.

21. A method for treating a patient in need of allergic desensitization, comprising
5 delivering a particle of claim 1 to a patient in need thereof.

22. The method of claim 21, wherein the particle is delivered subcutaneously, through inhalation, or across a mucosal surface.

10 23. The method of claim 21 wherein the particle is complexed with a pharmaceutically acceptable excipient and delivered as a spray, an aerosol, an ointment, an eye drop, a gel, a suspension, a capsule, a suppository, an impregnated tampon, or combinations thereof.

15 24. A method for providing a controlled release of allergen, comprising administering an effective amount of at least one particle of claim 1 to a patient in need thereof.

25. A method for inducing allergic desensitization in a patient, comprising administering an effective amount of a composition comprising:

- (a) at least one particle of claim 1, and
- 20 (b) a pharmaceutically acceptable carrier solution or other excipient to a patient in need thereof.

26. A composition comprising:

- (a) at least one particle of claim 1; and
- 25 (b) a pharmaceutically acceptable carrier or other excipient.